

Notes from the meeting – 5/2/2011 Whatcom CD ARM project, Ecology, USGS and EPA.

Discussion of the USGS proposal.

Attendees: Steve Cox,
Nichole Embertson
Don Matheny
Jennifer Crawford
Linda Anderson-Carnahan
Curt Black
CD....
Barb Cary
Rick Dinicola
Martha
Ron Cummings
George Boggs
Karma Anderson
Jill Gable
Debbie Robinson
Krista Mendelman

NE - Original proposal no GW monitoring. Ecology wanted. Nichole went to USGS and they presented good rationale. Now will incorporate nicely with additional funding. Wanted to make sure if they were doing it that it would be done right. Nichole will set up where. Steve will be fielding questions.

SC – Been working in Whatcom for decades. Regional GW movement. Good feel for questions. Looking at GW at water table will help to look at transport. NE asked that Steve would present a general approach. NE said don't be concerned about cost because this is challenging. Steve put together and visited with her, wrote up costs and rolled in cost figures from coop program. That is how we got into this. Key to this is that it is a paired test – 2 different management approaches. GW is an integrating approach that would support lysimeters. Hard to generalize about fine scale details. Hard to measure precisely at one spot when there is great heterogeneity. Therefore need multiple data points. How well can you implement strategy in this system? It is hard to set a rule around water movement to wells at this depth. There are a number of fields where you can test this to measure variability. This is how I thought best to do it. I have a number of approaches to measure gw in this proposal... pumping, passive, etc.

In the past we have had problems with field verification in Whatcom. How would this be different? Ecology has lots to bring to this. This is what he would propose. It can help provide broader sense of what is going on.

Shaded box represents the first comment in the series

| Ecology Comment | USGS Comment | CD Comment | EPA Comment |
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| We need a picture of the scheme? What is the question? | Do the differences in the management approaches translate into GW quality? | Treatment and control | |
| Do the different measurements result in different water quality? | Yes. Even with gw as integrator. | Yes | |
| How many sites should have GW sampling? | There is variability. Asked NE to pick something simple. Because of the diverse geology. First year keep it simple. Other years out to the more challenging soil so that they can make recommendations to all farms | 3 pairs for first year Is it necessary in year two to have GW monitoring? | |
| How are some field more challenging? | Hydrology – some sites are in different part of flow system. Water table doesn't change that much at creek but differences in the vertical groundwater table are accentuated. Need to pick areas where there are not converging flow lines. Need to pick areas where there is generally downward flow. Fields on a slope. | | |

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| Challenging fields close to SW? | YES. Any place where you have divergent flow lines. If you address only where it flows horizontally then it is easier. | | |
| Trying to get an idea of where are the challenging fields. Trying to figure out limitations and how it relates to the risk management system. | | | |
| How would you design this - what would you do? | RD – Anyone who works on lysimeter knows that anytime that you get negative/ no detect, someone will say ... oh you missed it. So now we want the GW to be like a big lysimeter. Easiest – steep sloped fields. More Challenge – flat. Challenge – high N in GW. In a sense we are trying to create a 10 acre lysimeter. | | Lucky to have a fair amount of recharge |
| | Screening – interval very short – Pumping - mm a minute syringe pump or ____ pump – slow pumping. Other options – dialysis bags in CA. Did diffusion samplers on Whidbey? | | Diffusion samplers might be good approach |
| Do we need to have 30 foot screens? | Depending on change in GW table – these are the challenging sites. Don't want to miss either season | | |

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| Don't get a lot of recharge in summer | Agreed – all depends | Have irrigated sites and so some will have trans - don't recommend irrigating more than need | |
| | May cause problems but can push it out of the way. Have more in the Sumas valley area. Wasn't thinking we would see much there. | | Iron impact? |
| Might see it deeper | There is a chance that you can have it going on below your packer. | | The well will be a passive thing |
| | Someone might. | | Do we have flow meters that go down 2 inch wells? |
| Challenges – Deharn farm – shallow monitoring wells. 13 feet and trying to get most recent and 1.5 feet deep. One of the interesting thing about this field is that 2 of the well have high DO most of the time probably some of denitrification going on - number of wells you choose is tricky – because if you take an average you might miss something | Yes. need multiple well. Want enough variability. | | |
| Coarser soil – less variability – fewer wells would be needed | | Will do this in the first round. The heavier soil will be the later. | |

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| | | If we are trying to map out something, we want to get the best information – want to show what is coming off the bottom of the roots. Deep wells will be challenging to understand data from deeper. Want to be able to look at data and tell if it represents what is going on in the field | |
| | | That is what we are doing. | Want to get to coarsest soils first. |
| What is the number of wells per test plot what is minimum? | What is the level of uncertainty you are willing to live with? | | |
| Have to have a problem statement and then need to have an error band – what is the decision that has to be made? | Would like to have data to say we have this variability at the water table but not aware of data to guide us. | | |
| | 2-4 wells | Have number on table of 3 wells | Need 4 to start with. |
| So are we thinking 4 to start with. | | Will determine variability in first year to see if we need more or less wells. If we have a lot of variability then we will change next year. As data is gathered we will change. | |
| How do you do that in a qapp? | If there is variability how would that change the ARM? | Will be detailed in the QAPP. | |
| Trick is keeping field undisturbed. 20 lys in a ten acre field is tricky | What about tripling lys? | The field needs to normalize. A time frame is given for that | |

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| | Plusses of 20 lysimeters – doesn't miss anything. But it will integrate everything. In experimental sense might want to go with more lysimeters. | Instead of Gw? | |
| That is my question | | Another point – if there is less than 20 mg/l of N and then is it 18 is it success? If we decrease by 2? | It is complicated. If you are delivering 18 to top few cm. |
| The question needs to be structured. We are comparing the old way and new way. | | Is that meeting the objective? | |
| Was the difference a success even if we are 2 times the DW then we are not successfully managing N. Are we doing Poor or a little less than Poor. That is not OK. BC – we might be more than 28 because it is not dissolved. | | My objective is to find a difference between treatment and control. | |
| Need to integrate with overall project. | | Measurement is not going to quantify GW. It will not have flow volume it will only have a concentration. The question is ... Is this a better management system. | |
| Need to get down to a level where people can drink water | | | |
| We need gw model. | | | LA – unrealistic to get to GW that will meet WQ standards/ EPA wants to improve GW quality |

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| | | | Complex systems. Planning, management, BMP success issues. The CD is looking for technical improvements but the bigger issues won't be addressed by this project |
| We can talk about how you till, etc. but we are really talking about timing and amount. Understand project but can't accept 20 mg/l as success. | | | Keep in context. Will look in context of DW standard. We are not eliminating risk. This is first test. There are other questions about how you implement beyond this project. How do you educate? How do you do compliance? Let's not get too large. |
| | Just data collection right now – might turn out that only use the process on low risk fields. But data set needs to look at ... will the data collection be able tell the difference between treatment and control. We will have the information that you can do root zone modeling later. | | |

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| Rc -We do not want to implement a nutrient strategy that makes incremental improvement. Talking about manure management strategy at the end of the day we hope we are protecting GW – if we are not creating a system that is protective then we should not have widespread use of this system . | | Arm is not to encourage bad application. The Ron raises policy issues. Are the agronomic rates appropriate? it is a policy call from the regulatory agencies. System does not do that. How can we distill for a person who has high school degree in a simple way what they need to do? Do we need to apply a new policy? | |
| | Move into second and following years might pull back on the fields that have consistent numbers and scale back on those in the out years. | | |
| Lots of sampling | | That is what we will need to answer the questions. | |
| Weather will impact movement of N in through to the GW | Especially in the fall | | |
| | Need continuous data – water level and how it will change over time. | | |
| Yes – it is my overall concept of success | | | LA – any mm system is not acceptable. Are you ok with this system? |
| Agree | | | I want to collect enough data |
| I still have hesitation to apply manure in Jan. | | | If we have controls in place could you live with that? |

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| There are controls but don't know if they are adequate. | | Why are you concerned about January? Have spent an incredible amount of time explaining. Project will show if that is appropriate. | What type of controls are needed? We will talk about that at another time. |
| If a qapp addendum is being developed then that should answer questions. | | | Need to pin down number of wells |
| | Goal is not having a pulse of N at any time. | Is high N in December better than high in January? | |
| Worksheet | | | |
| | | CD – sent out worksheet – it is a alive active document the thresholds change all the time – have not developed surface water. Encourage not to submit comments. Will convene cohort and would prefer to do it through that point. What you have is skeleton. If you read through it and think that there is something that is a larger issue and you can send positive forward looking comments, it is OK to send comments. If you want to be part of the cohort ground let NE know. If you want to designate folks need to have folks invested in project over the long term. | Talking about adaptive management of this |

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| | | We have not had opportunity to build cohort group yet. Building one relationship at a time. NE seconded the thanking of ECY for their comment. | Thank you to ECY for your comments. They have made the project more robust. |
| | | Currently timeline first meetings mid –end of May. | Timeline? |
| We have heard from beginning and we will be part of group. | | Does ECY have a delegation? | |
| Will think about it. | | Just a couple of people working on that part of the work sheet. GW person. SW person. Martha will get back to Nichole | |
| Martha will work on this | | OK. Martha will work on this? | |
| At what point will we get to a risk management system that we will be implementing? | | Stating this summer. Based on worksheet. | |
| Ecology will have concerns by end of week | | Will not be talking about winter right now. The default is nothing. Just want it to be practical with what is happening in the fields right now. | |
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What conclusions do you reach?

SC – do we move from here for a project proposal? Putting that together is part of the project? Are there road blocks?

GB - worth doing

NE - worth talking about project objectives and clear that up

What are you thinking?

SC - want to talk to Barb

JG – Nichole is open to receiving feed back

NE - would like cooperative relationship

RC – good that we could discuss issues openly

MM - Resources are tight wondering what we are committing to

RD – learned about programs

BC – good to hear different parts of study

?? from CD Feel like everyone is ignoring big problem and we are trying to make a tool to help them. And everyone is trying to destroy the project ..NRCS allows us to have winter application and we need to have the pieces that we to manage this. Things just seem to be getting out of hand

CB - hopefully what we can measure the changes. The meeting was good for relationships.

JC – nice to have productive meeting – faces to names

DM – good to hear about complex issues that surround GW in Whatcom. Clear that we might not be able to answer questions that need to be answered or the final questions.